

General

Guideline Title

Evidence-based clinical practice guideline on the nonsurgical treatment of chronic periodontitis by means of scaling and root planing with or without adjuncts.

Bibliographic Source(s)

Smiley CJ, Tracy SL, Abt E, Michalowicz BS, John MT, Gunsolley J, Cobb CM, Rossmann J, Harrel SK, Forrest JL, Hujoel PP, Noraian KW, Greenwell H, Frantsve-Hawley J, Estrich C, Hanson N. Evidence-based clinical practice guideline on the nonsurgical treatment of chronic periodontitis by means of scaling and root planing with or without adjuncts. J Am Dent Assoc. 2015 Jul;146(7):525-35. [74 references] [PubMed](#)

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

The levels of certainty in the body of evidence (High-Low) and the grades of recommendations (Strong-Against) are defined at the end of the "Major Recommendations" field.

Clinical Recommendations

Scaling and Root Planing (SRP)

For patients with chronic periodontitis, clinicians should consider SRP as the initial treatment (In favor). The authors note that the strength of the recommendation is limited because SRP is considered the reference standard and thus used as an active control for periodontal trials and there are few studies in which investigators compare SRP with no treatment.

Systemic Subantimicrobial-Dose Doxycycline (SDD) and SRP

For patients with moderate to severe chronic periodontitis, clinicians may consider systemic SDD (20 milligrams twice a day) for 3 to 9 months as an adjunct to SRP, with a small net benefit expected (In favor).

Systemic Antimicrobials and SRP

For patients with moderate to severe chronic periodontitis, clinicians may consider systemic antimicrobials as an adjunct to SRP, with a small net

benefit expected (Weak).

Locally Delivered Antimicrobials and SRP

Chlorhexidine Chips and SRP

For patients with moderate to severe chronic periodontitis, clinicians may consider locally delivered chlorhexidine chips as an adjunct to SRP with a moderate net benefit expected (Weak).

Doxycycline Hyclate Gel and SRP

For patients with moderate to severe chronic periodontitis, clinicians may consider locally delivered doxycycline hyclate gel as an adjunct to SRP, but the net benefit is uncertain (Expert opinion for).

Minocycline Microspheres and SRP

For patients with moderate to severe chronic periodontitis, clinicians may consider locally delivered minocycline microspheres as an adjunct to SRP, but the net benefit is uncertain (Expert opinion for).

Nonsurgical Use of Lasers and SRP

Photodynamic Therapy (PDT) Diode Laser and SRP

For patients with moderate to severe chronic periodontitis, clinicians may consider PDT using diode lasers as an adjunct to SRP, with a moderate net benefit expected (Weak).

Non-PDT Diode Laser and SRP

For patients with moderate to severe chronic periodontitis, clinicians should be aware that the current evidence shows no net benefit from diode lasers (non-PDT) when used as an adjunct to SRP (Expert opinion against).

Neodymium: Yttrium-Aluminum-Garnet (Nd:YAG) Laser and SRP

For patients with moderate to severe chronic periodontitis, clinicians should be aware that the current evidence shows no net benefit from Nd:YAG lasers when used as an adjunct to SRP (Expert opinion against).

Erbium Laser and SRP

For patients with moderate to severe chronic periodontitis, clinicians should be aware that the current evidence shows no net benefit from erbium lasers when used as an adjunct to SRP (Expert opinion against).

Definitions

Level of Certainty in the Body of Evidence Included within the Systematic Review

Level of Certainty in Effect Estimate	Description
High	The body of evidence usually includes consistent results from well-designed, well-conducted studies in representative populations. This conclusion is unlikely to be affected strongly by the results of future studies. This statement is established strongly by use of the best available evidence.
Moderate	As more information becomes available, the magnitude or direction of the observed effect could change, and this change could be large enough to alter the conclusion. This statement is based on preliminary determination from the current best available evidence, but confidence in the estimate is constrained by 1 or more factors, such as the following: <ul style="list-style-type: none">• Limited number or size of studies• Plausible bias that raises some doubt about the results• Inconsistency of findings across individual studies• Imprecision in the summary estimate• Limited applicability because of the populations of interest• Evidence of publication bias• Lack of coherence in the chain of evidence

Level of Certainty in Effect Estimate	Description
	More information could allow a reliable estimation of effects on health outcomes. The available evidence is insufficient to support the statement, or the statement is based on extrapolation from the best available evidence. The evidence is judged to be insufficient, or the reliability of estimated effects is limited by factors such as the following:
	<ul style="list-style-type: none"> • Limited number or size of studies • Plausible bias that seriously weakens confidence in the results • Inconsistency of findings across individual studies • Imprecision in the summary estimate • Gaps in the chain of evidence • Findings not applicable to the populations of interest • Evidence of publication bias • Lack of information on important health outcomes

Definitions for the Strength and Direction of Recommendations

Recommendation Strength	Definition
Strong	Evidence strongly supports providing this intervention. There is a high level of certainty of benefits and the benefits outweigh the potential harms.
In Favor	Evidence favors providing this intervention. Either there is a high level of certainty of benefits, but the benefits are balanced with the potential harms, or there is a moderate level of certainty of benefits, and the benefits outweigh the potential for harms.
Weak	Evidence suggests implementing this intervention after alternatives have been considered. There is a moderate level of certainty of benefits, and either the benefits are balanced with potential harms or there is uncertainty about the magnitude of the benefit.
Expert Opinion For	Expert opinion suggests this intervention can be implemented, but there is a low level of certainty of benefits, and there is uncertainty in the benefit-to-harm balance.
Expert Opinion Against	Expert opinion suggests this intervention not be implemented because there is a low level of certainty that there is no benefit or the potential harms outweigh benefits.
Against	Evidence suggests not implementing this intervention or discontinuing ineffective procedures. There is moderate or high certainty that there are no benefits or the potential harms outweigh the benefits.

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Chronic periodontitis

Guideline Category

Management

Treatment

Clinical Specialty

Intended Users

Dentists

Guideline Objective(s)

To assist general practitioners with decision making about the use of scaling and root planing (SRP), as well as locally delivered and systemic adjuncts, for patients with periodontitis

Note: This guideline does not address surgical periodontal treatments.

Target Population

Patients with chronic periodontitis

Interventions and Practices Considered

1. Scaling and root planing (SRP) (no adjuncts)
2. Systemic subantimicrobial-dose doxycycline (SDD) and SRP
3. Systemic antimicrobials and SRP
4. Locally delivered antimicrobials and SRP
 - Chlorhexidine chips and SRP
 - Doxycycline hyclate gel and SRP
 - Minocycline microspheres and SRP
5. Photodynamic therapy (PDT) diode laser and SRP

Note: The following interventions were considered but not recommended:

- Non-PDT diode laser and SRP
- Neodymium:yttrium-aluminum-garnet (Nd:YAG) laser and SRP
- Erbium laser and SRP

Major Outcomes Considered

- Clinical attachment level (CAL)
- Adverse effects of treatment

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Searches of Unpublished Data

Description of Methods Used to Collect/Select the Evidence

Note from the National Guideline Clearinghouse (NGC): A systematic review and meta-analysis and a full report were prepared by the American Dental Association (ADA) Council on Scientific Affairs (see the "Availability of Companion Documents" field).

Methods

The authors searched 2 electronic databases (PubMed and EMBASE) and reviewed the references of selected systematic reviews to identify missed references. The search was first conducted in October 2012 and updated in July 2014.

The authors developed study inclusion and exclusion criteria through consensus. Briefly, they included randomized controlled trials if they were published after 1960, written in English, and reported changes in clinical attachment level (CAL) at least 6 months after randomization. They chose CAL as a primary outcome because probing depth changes fail to capture the effect of nonsurgical treatment. The authors included both parallel-arm and split-mouth studies. The authors excluded studies of aggressive periodontitis, as well as studies in which the adjunct was administered more than 1 week after scaling and root planing (SRP) or was reapplied to progressing (worsening) tooth sites. They screened all citations and full-text articles independently and in duplicate. In cases of discrepancies, they made decisions via discussion with the rest of the panel.

The authors excluded studies on debridement as the experimental treatment as well as studies using the terms *instrumentation*, *ultrasonic instrumentation*, *ultrasonic scaling*, or *subgingival scaling* to mean *debridement*.

Please see the full report for more details on the literature search and the inclusion/exclusion criteria.

Number of Source Documents

The initial search yielded 1,681 unique records after duplicates were removed. After the updated search, the authors screened 1,944 records by title and abstract and 483 by full text. They included 72 studies in the final analyses. See Figure 1 in the systematic review (see the "Availability of Companion Documents" field) for a flow diagram of the literature search and screening process.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Level of Certainty in the Body of Evidence Included within the Systematic Review

Level of Certainty in Effect Estimate	Description
High	The body of evidence usually includes consistent results from well-designed, well-conducted studies in representative populations. This conclusion is unlikely to be affected strongly by the results of future studies. This statement is established strongly by use of the best available evidence.
Moderate	As more information becomes available, the magnitude or direction of the observed effect could change, and this change could be large enough to alter the conclusion. This statement is based on preliminary determination from the current best available evidence, but confidence in the estimate is constrained by 1 or more factors, such as the following: <ul style="list-style-type: none">• Limited number or size of studies• Plausible bias that raises some doubt about the results• Inconsistency of findings across individual studies• Imprecision in the summary estimate• Limited applicability because of the populations of interest• Evidence of publication bias• Lack of coherence in the chain of evidence
Low	More information could allow a reliable estimation of effects on health outcomes. The available evidence is insufficient to support the statement, or the statement is based on extrapolation from the best available evidence. The evidence is judged to be insufficient, or the reliability of estimated effects is limited by factors such as the following:

Level of Certainty in Effect Estimate	Description
	<ul style="list-style-type: none"> • Limited number or size of studies • Plausible bias that seriously weakens confidence in the results • Inconsistency of findings across individual studies • Imprecision in the summary estimate • Gaps in the chain of evidence • Findings not applicable to the populations of interest • Evidence of publication bias • Lack of information on important health outcomes

Methods Used to Analyze the Evidence

Meta-Analysis

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Note from the National Guideline Clearinghouse (NGC): A systematic review and meta-analysis and a full report were prepared by the American Dental Association (ADA) Council on Scientific Affairs (see the "Availability of Companion Documents" field).

Data Extraction and Critical Appraisal of Individual Studies

In groups of 2 (1 ADA staff member and 1 panelist for each paper), the authors independently reviewed and extracted the relevant data from included studies and appraised each study with the Cochrane Risk of Bias Tool. Details on the tool and summaries of the extracted data and critical appraisals are presented in the full report. In short, 6 domains are assessed and judged as low, unclear, or high risk of bias. Furthermore, a summary assessment risk of bias of the outcome across domains and across studies was conducted according to the Cochrane Handbook. The authors extracted information concerning adverse effects, which are described fully in the clinical practice guideline associated with this systematic review and in the unabridged version.

Data Synthesis and Meta-Analysis: Evaluating the Effect of the Intervention

The authors decided to use clinical attachment level (CAL) as the primary outcome to compare the effectiveness of various periodontal therapies. They chose to subgroup results on the basis of trial design. The authors chose not to stratify the studies according to levels of disease at baseline. In assessing the effectiveness of scaling and root planing (SRP) alone (question 1), they compared mean change in CAL between SRP and controls. To assess adjuncts (question 2), they compared mean changes between groups receiving SRP and those receiving SRP plus an adjunct. The authors conducted meta-analyses by using the random effects model.

They noted inconsistency among studies regarding the number of tooth sites and teeth assessed. Investigators in some studies reported data for periodontal sites, whereas others reported data at the tooth level and whole-mouth averages. Whole-mouth measurements may lead to underestimation of the treatment effect by including healthy sites in the computation of teeth or mouth averages or of changes over time. The estimates in the meta-analyses include studies in which the investigators reported at these different levels of assessment.

Determining the Level of Certainty in the Evidence

The authors reviewed overall results for each treatment or adjunct and assessed the level of certainty in the evidence as high, moderate, or low (see the "Rating Scheme for the Strength of the Evidence" field).

Please see the full report for more details on the data analysis.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

The authors constitute a multidisciplinary panel of subject matter experts and American Dental Association (ADA) staff methodologists convened by the ADA Council on Scientific Affairs (CSA). The accompanying systematic review (see the "Availability of Companion Documents" field) provides the evidence base for this guideline.

The guideline panel addressed the following clinical questions, formatted in the Patient-Intervention-Comparator-Outcome style:

- Question 1: In patients with chronic periodontitis, does scaling and root planing (SRP) (hand or ultrasonic), when compared with no treatment, supragingival scaling and polish (prophylaxis), or debridement, result in greater improvement of clinical attachment level (CAL)?
- Question 2: In patients with chronic periodontitis, does the use of locally delivered antibiotics or antimicrobials, systemic antibiotics, combinations of locally delivered and systemic antibiotics, agents for biomodification or host modulation, or nonsurgical lasers as adjuncts to SRP, compared with SRP alone, result in greater improvement of CAL?

Determining the Net Benefit Rating

The development of evidence-based clinical practice guidelines requires a determination of the net benefit rating for each intervention. The authors assessed each treatment's net benefit by evaluating its clinical benefits against its adverse effects (AEs). They evaluated the frequency and severity of AEs as reported in the included studies or by the U.S. Food and Drug Administration (FDA). In determining the net benefit rating of each treatment, the authors judged whether the benefits clearly outweigh the AEs; the benefits and AEs are balanced closely, or there is uncertainty in the estimate of the balance; or the AEs clearly outweigh the benefits.

Determining Strength of Clinical Recommendations

The clinical recommendation strength is a result of crossing the appropriate row (the guideline panel's determination of the level of certainty in the evidence as high, moderate, or low) and column (net benefit rating) (see the table below). The definitions for each level of recommendation strength are provided in the "Rating Scheme for the Strength of the Recommendations" field.

Balancing Level of Certainty and Net Benefit Rating to Arrive at Clinical Recommendation Strength

Level of Certainty	Net Benefit Rating		
	Benefits Outweigh Potential Harms	Benefits Balanced with Potential Harms	No Benefits or Potential Harms Outweigh Benefits
High	Strong	In Favor	Against
Moderate	In Favor	Weak	Against
Low	Expert opinion for or expert opinion against		

Rating Scheme for the Strength of the Recommendations

Definitions for the Strength and Direction of Recommendations

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Expert Opinion Against	Expert opinion suggests this intervention not be implemented because there is a low level of certainty that there is no benefit or the potential harms outweigh benefits.
Against	Evidence suggests not implementing this intervention or discontinuing ineffective procedures. There is moderate or high

Recommendation	certainty that there are no benefits or the potential harms outweigh the benefits.
Strength	Definition

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Clinical practice guidelines undergo internal and external review to ensure scientific accuracy, clarity, and clinical usefulness. External reviewers include: 1) clinical content experts, who are asked to review the document to verify the completeness of the literature review and to ensure clinical sensibility; 2) experts in systematic reviews and/or guideline development, who are asked to review the method by which the recommendation was developed; 3) potential users of the recommendations, who are asked to judge their usefulness; and 4) stakeholders who may be affected by the recommendations, including but not limited, to third party-provider trade organizations. The expert panel as well as Center staff nominate and select external reviewers. A PDF file of the manuscript (helpful if line numbers are included) is provided to the external reviewers with explicit instructions to provide written comments along with justifications for requested change(s). After all comments have been received, Center staff compiles the comments and schedules conference calls with the panel members to discuss comments and determine if changes in the manuscript are needed, and if so, what the changes are. Currently, no feedback is provided to the external reviewers with respect to how their comments were addressed; however, all comments should be considered by the expert panel although they need not be accepted.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Improvement in clinical attachment level (CAL)

Refer to the original guideline document for benefits and net benefits of specific interventions and practices considered in the guideline.

Potential Harms

- Any type of root planing, including hand and ultrasonic instrumentation, carries the risk of damaging the root surface and potentially causing tooth or root sensitivity. Generally expected post-scaling and root planing (SRP) procedural adverse effects (AEs) include discomfort.
- The AEs that were judged possibly to be related to subantimicrobial-dose doxycycline (SDD) in clinical trials were dizziness and tachycardia. The package insert lists the most frequent adverse reactions that occurred during clinical trials as headache, common cold, flu symptoms, and toothache.
- Antimicrobials as a class of drugs are well known to cause allergic reactions in some people. Other AEs commonly are reported (this list is not exhaustive), such as rash, diarrhea, abdominal pain, nausea, or vomiting, although their rates of occurrence are often not statistically different in treated and control groups. In addition, the overuse of antimicrobials promotes the development of resistant strains of bacteria,

which are a risk to the population.

- One case of nontreatment-related aphthae on the buccal mucosa was reported with locally delivered chlorhexidine chips as an adjunct to SRP. According to U. S. Food and Drug Administration (FDA) prescribing information, the most frequently observed AEs were toothache, upper respiratory tract infection, and headache. Oral pain or sensitivity may occur during the first week after SRP and chip placement, although in some cases it may occur later, but it is typically mild to moderate in severity and is expected to resolve within days. Post-marketing surveillance indicates that anaphylaxis, as well as serious allergic reactions, have occurred with dental products containing chlorhexidine.
- The package insert lists several potential AEs with doxycycline hyclate use such as headache, gingival discomfort (pain or soreness), toothache, periodontal problems (abscess, exudate, infection, drainage, extreme mobility, or suppuration), thermal tooth sensitivity, or sore mouth. The package insert also states that 1.6% of participants in a doxycycline hyclate (Atridox, CollaGenex Pharmaceuticals) clinical trial of more than 1,400 participants reported "unspecified essential hypertension," whereas only 0.2% in the vehicle control arm and none in either the SRP or oral hygiene instruction arms reported this AE. There is no known association of oral doxycycline hyclate use with essential hypertension.
- The most common AEs with minocycline microspheres and SRP included headache, dental infection, increased periodontitis, tooth sensitivity, tooth caries, dental pain, gingivitis, and stomatitis. One study reported one AE (black hairy tongue) that was ruled to be possibly drug related. Other AEs were reported but judged not to be related to study medication.

Refer to the original guideline document for additional details on AEs of specific interventions and practices considered in the guideline.

Contraindications

Contraindications

Patients with known hypersensitivity to chlorhexidine should not receive chlorhexidine chips.

Qualifying Statements

Qualifying Statements

This clinical practice guideline is intended to assist general practitioners with decision making about the use of scaling and root planing (SRP), as well as locally delivered and systemic adjuncts, for patients with periodontitis. This guideline does not address surgical periodontal treatments. Not all patients with chronic periodontitis respond adequately to non-surgical treatment with or without adjuncts, and the practitioner should consider surgical or other more complex interventions or referral to a specialist when appropriate. The recommendations in this document do not purport to define a standard of care. Rather, as part of the evidence-based dentistry approach, these recommendations should be integrated with each practitioner's professional judgment and each patient's needs and preferences.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Quick Reference Guides/Physician Guides

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

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Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2015 Jul

Guideline Developer(s)

American Dental Association - Professional Association

Source(s) of Funding

American Dental Association

Guideline Committee

American Dental Association Council on Scientific Affairs Expert Panel

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

Dr. Michalowicz has received research support from OraPharma and Atrix Laboratories in the past. Dr. Cobb was the principal investigator of the University of Missouri-Kansas City site for a multicenter clinical trial conducted by OraPharma (Arestin) and has been an unpaid consultant for Hu-Freidy and Livionex. Dr. Hujoel is a national scientific advisor for Delta Dental Plans. Dr. Noraian is a certified instructor for the Institute for Advanced Laser Dentistry. Dr. Greenwell was part of a multicenter study for Millennium Dental Technologies and a laser study for American Dental Technologies. None of the other authors reported any disclosures.

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the [Journal of the American Dental Association \(JADA\) Web site](#) .

Availability of Companion Documents

The following are available:

- Smiley CJ, Tracy SL, Abt E, Michalowicz BS, John MT, Gunsolley J, Cobb CM, Rossmann J, Harrel SK, Forrest JL, Hujoel PP, Noraian KW, Greenwell H, Frantsve-Hawley J, Estrich C, Hanson N. Systematic review and meta-analysis on the nonsurgical treatment of chronic periodontitis by means of scaling and root planing with or without adjuncts. J Am Dent Assoc. 2015 Jul;146(7):508-24. Available from the [Journal of the American Dental Association \(JADA\) Web site](#) .
- Smiley CJ, Tracy SL, Abt E, Michalowicz BS, John MT, Gunsolley J, Cobb CM, Rossmann J, Harrel SK, Forrest JL, Hujoel PP, Noraian KW, Greenwell H, Frantsve-Hawley J, Estrich C, Hanson N. Systematic review and meta-analysis on the nonsurgical treatment of chronic periodontitis by scaling and root planing with or without adjuncts. Full report. 2015 Jul. 179 p. Available from the [American Dental Association \(ADA\) Center for Evidence-Based Dentistry \(EBD\) Web site](#) .
- Nonsurgical treatment of chronic periodontitis by scaling and root planing with or without adjuncts: clinical practice guideline. Chairside guide. Chicago (IL): American Dental Association; 2015. 2 p. Available from the [ADA Center for EBD Web site](#) .
- ADA clinical practice guidelines handbook: 2013 update. Chicago (IL): American Dental Association; 2013 Nov. 58 p. Available from the [ADA Center for EBD Web site](#) .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on August 28, 2015. The information was not verified by the guideline developer.

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